WHAT IS CLAIMED IS:

1. A read channel, comprising:

an equalizer configured to equalize a digital signal to provide equalized reproduced signals; and

a Viterbi detector capable of receiving the equalized reproduced signals and converting the reproduced signals into a digital output signal indicative of data stored on a recording medium;

wherein the equalizer is implemented using a lengthened equalization target wherein the lengthened equalization target comprises a mathematical convolution of a first and a second transfer function, the first transfer function comprising a predetermined equalization target for providing desired shaping to the read signal and the second transfer function comprising a matched filter function providing a time-reversed component that is a time-reversed replica of a whitening filter component of the equalization target.

2. The read channel of claim 1, wherein the predetermined equalization target comprises a 16-state equalization target having a length of 7.

3. The read channel of claim 1, wherein lengthened equalization target is symmetrical and comprises only two programmable parameters.

4. The read channel of claim 1, wherein coefficients of the lengthened equalization target are independently adjustable while maintaining a DC null and a desired Nyquist null.

5. The read channel of claim 1, wherein the lengthened equalization target comprises a base partial response component, a fractional coefficient polynomial component and a time-reversed replica of the fractional coefficient polynomial component.

6. The read channel of claim 1, wherein the lengthened equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.

7. The read channel of claim 1, wherein the lengthened equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal to (p1/p2) + p1 and b is equal to $((p_1^2+1)/p_2)+p_2-1$.

8. The read channel of claim 7, wherein a and b are programmable.

9. A signal processing system, comprising:

memory for storing data therein; and

a processor, coupled to the memory, for equalizing a digital signal to provide equalized reproduced signals using a lengthened equalization target, wherein the lengthened equalization target comprises a mathematical convolution of a first and a second transfer function, the first transfer function comprising a predetermined equalization target for providing desired shaping to the read signal and the second transfer function comprising a matched filter function providing a time-reversed component that is a time-reversed replica of a whitening filter component of the equalization target.

10. The signal processing system of claim 9, wherein the predetermined equalization target comprises a 16-state equalization target having a length of 7.

11. The signal processing system of claim 9, wherein lengthened equalization target is symmetrical and comprises only two programmable parameters.

12. The signal processing system of claim 9, wherein coefficients of the lengthened equalization target are independently adjustable while maintaining a DC null and a desired Nyquist null.

13. The signal processing system of claim 9, wherein the lengthened equalization target comprises a base partial response component, a fractional coefficient polynomial component and a time-reversed replica of the fractional coefficient polynomial component.

14. The signal processing system of claim 9, wherein the lengthened equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.

15. The signal processing system of claim 9, wherein the lengthened equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal to (p1/p2) + p1 and b is equal to $((p_1^2+1)/p_2)+p_2-1$.

16. The signal processing system of claim 15, wherein a and b are programmable.

17. An equalizer implemented in accordance with a lengthened equalization target wherein the lengthened equalization target comprises a mathematical convolution of a first and second transfer function, the first transfer function comprising a predetermined equalization target for providing desired shaping to the read signal and the second transfer function comprising a matched filter function providing a time-reversed component that is a time-reversed replica of a whitening filter component of the equalization target.

18. The equalizer of claim 17, wherein lengthened equalization target is symmetrical and comprises only two programmable parameters.

19. The equalizer of claim 17, wherein coefficients of the lengthened equalization target are independently adjustable while maintaining a DC null and a desired Nyquist null.

20. The equalizer of claim 17, wherein the lengthened equalization target comprises a base partial response component, a fractional coefficient polynomial component and a time-reversed replica of the fractional coefficient polynomial component.

21. The equalizer of claim 17, wherein the lengthened equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.

22. The equalizer of claim 17, wherein the lengthened equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal to (p1/p2) + p1 and b is equal to $((p_1^2+1)/p_2)+p_2-1$.

23. The equalizer of claim 22, wherein a and b are programmable.

24. A magnetic storage device, comprising:

a magnetic storage medium for recording data thereon;

a motor for moving the magnetic storage medium;

a head for reading and writing data on the magnetic storage medium;

an actuator for positioning the head relative to the magnetic storage medium; and

a data channel for processing encoded signals on the magnetic storage medium, the data channel comprising an equalizer implemented in accordance with a lengthened equalization target wherein the lengthened equalization target comprises a mathematical convolution of a first and second transfer function, the first transfer function comprising a predetermined equalization target for providing desired shaping to the read signal and the second transfer function comprising a matched filter function providing a time-reversed component that is a time-reversed replica of a whitening filter component of the equalization target.

25. The magnetic storage device of claim 24, wherein the predetermined equalization target comprises a 16-state equalization target having a length of 7.

26. The magnetic storage device of claim 24, wherein lengthened equalization target is symmetrical and comprises only two programmable parameters.

27. The magnetic storage device of claim 24, wherein coefficients of the lengthened equalization target are independently adjustable while maintaining a DC null and a desired Nyquist null.

28. The magnetic storage device of claim 24, wherein the lengthened equalization target comprises a base partial response component, a fractional coefficient polynomial component and a time-reversed replica of the fractional coefficient polynomial component.

29. The magnetic storage device of claim 24, wherein the lengthened equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.

30. The magnetic storage device of claim 24, wherein the lengthened equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal to (p1/p2) + p1 and b is equal to $((p_1^2+1)/p_2)+p_2-1$.

31. The magnetic storage device of claim 30, wherein a and b are programmable.

32. An equalizer implemented in accordance with means for shaping a channel impulse response to a desired target shape, the means for shaping comprises a first means for providing desired shaping to the read signal and a second means for providing a time-reversed component that is a time-reversed replica of a whitening filter component of the means for shaping.